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*Application of elastic flows to cell motility*

We propose a framework to model and simulate cell motility and chemotaxis. The plasma membrane dynamics is governed by a geometric evolution law accounting for its mechanical properties which results in mean curvature or Willmore flow type equations. For the polarisation of the cell due to external signals we postulate a reaction diffusion system of species located on the plasma membrane. Protrusion is then achieved by back-coupling the cell surface quantities to the geometric equation by means of an additional forcing term. We demonstrate the ability of this approach to describe the pseudopod driven chemotaxis as, for instance, featured by neutrophil cells, and the persistent motion of fish keratocytes. We also investigate some qualitative aspects of the general approach and point out possible extensions. (This is joint work with C Elliott and C Venkataraman.)